

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
9 September 2005 (09.09.2005)

PCT

(10) International Publication Number  
**WO 2005/082993 A1**

(51) International Patent Classification<sup>7</sup>: **C08K 7/10**

(21) International Application Number:  
PCT/KR2005/000038

(22) International Filing Date: 7 January 2005 (07.01.2005)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:  
10-2004-0013782 28 February 2004 (28.02.2004) KR  
10-2005-0000687 5 January 2005 (05.01.2005) KR

(71) Applicant (for all designated States except US): **KOREA UNIVERSITY INDUSTRY AND ACADEMY COOPERATION FOUNDATION** [KR/KR]; Anam-dong 5-ga 1, Seongbuk-gu, Seoul 136-701 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KIM, Woo Nyon** [KR/KR]; Halsol Apt 107-401 Irwon-dong, Gangnam-gu, Seoul 135-230 (KR). **SEO, Won Jin** [KR/KR]; Munchon

Maeul 8-Danji Munchon-DongA Apt 802-103, Juyeop 2-dong, Ilsan-gu, Goyang-si, Kyunggi-do 411-748 (KR). **HAN, Jae Sung** [KR/KR]; Jugong Apt 504-807, Byeongryang-dong, Gwacheon-si, Kyunggi-do 427-732 (KR).

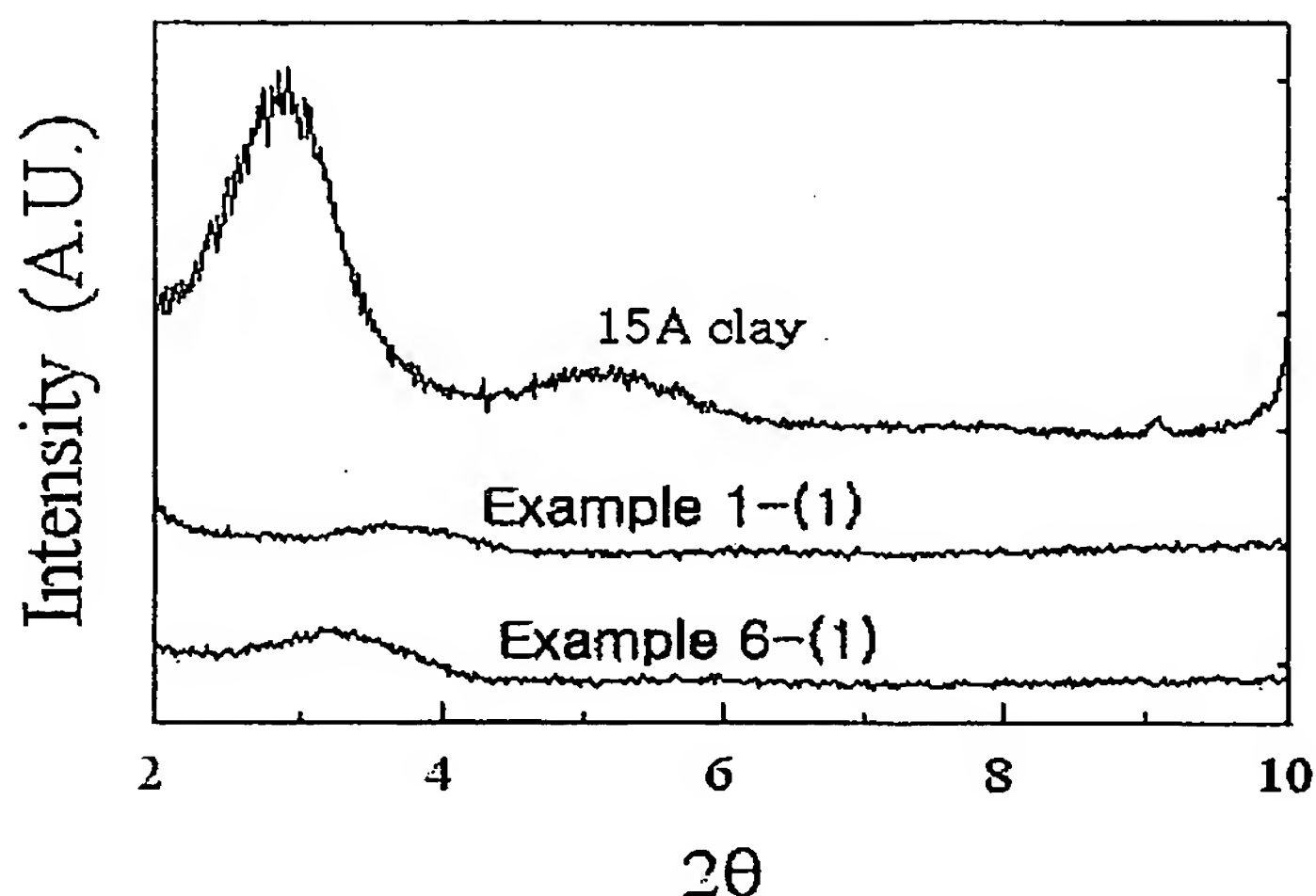
(74) Agents: **HYUN, Jong Cheol** et al.; Youngin building 3rd Floor, 1708-7, Seocho-dong, Seocho-gu, Seoul 137-884 (KR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: **CLAY-POLYURETHANE NANOCOMPOSITE AND METHOD FOR PREPARING THE SAME**



(57) Abstract: Disclosed herein is a clay-polyurethane nanocomposite comprising a clay and a polyurethane covalently bonded to the surface of the clay wherein the polyurethane is formed by reacting a clay-containing diisocyanate compound with a polyol, the clay-containing diisocyanate compound contains a diisocyanate compound covalently bonded to surface silanol groups of the clay and 0.5-5% by weight of the clay based on the diisocyanate compound, and the clay is exfoliated by the polyurethane such that no wide-angle X-ray diffraction (WAXD) peak is detected between 2° and 10° by XRD measurement. The clay-polyurethane nanocomposite has a structure wherein the clay layers are completely exfoliated, rather than a structure wherein the polyurethane is intercalated between the clay layers. Accordingly, the clay-polyurethane nanocomposite has superior physical properties to a pure polyurethane. In addition, the clay-polyurethane nanocomposite can be foamed to prepare a foamed clay-polyurethane nanocomposite, which has superior physical properties, such as mechanical strength and flame retardance, to a common polyurethane foam.



FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*